EGRESS WIDTH WORKSHEET

ROOM OR SPACE DESIGNATION	OCCUPANCY OR USE CLASSIFICATION	OCCUPANT LOAD FROM WORKSHEET	STAIR WIDTH FACTOR	REQUIRED STAIRWAY WIDTH	OTHER EGRESS COMPONENT FACTOR	OTHER EGRESS COMPONENT WIDTH

Is part of the space shown above an *assembly seating facility*? ____ If yes, then the Assembly Egress Width Sub-Worksheet should be completed for calculating minimum width requirements.

Ideally the Occupant Load Worksheet should be completed first, before this worksheet, so that the results of that sheet may be simply inserted into the first three columns of this worksheet.

ASSEMBLY EGRESS WIDTH SUB-WORKSHEET

Is the occupant load of a Group A occupancy over 300 persons? ____ (Yes or No) If yes, see Section 1008.1

Is the assembly seating area smoke-protected? _____ (Yes or No)

> If **yes**, then an evaluation per NFPA 101 shall be submitted with the plans and the egress widths shall be based not IBC Table 1008.5.2 minimums. All of the requirements of Sections 1008.5.2.1, 1008.5.2.2, and 1008.5.2.3 must be met, or else it is not smoke-protected seating.
>
> If **no**, then use the following requirements from Section 1008.5.1 as listed below.

Clear width of aisles and other means of egress for non-smoke-protected seating shall be per cases 1 through 6 below. *(Indicate which formula is being used.)*

Where **W** = Required width in **inches per occupant**
R = Riser height in inches (from tread to tread)

Case 1 – Where **R** $\leq$ 7.0" Then **W = 0.3** (Formula 10-1)

Case 2 – Where **R** > 7.0" Then **W = 0.3 + 10(R – 7.0")(0.005)** (Formula 10-2)

Case 3 – Where egress requires stair descent without a handrail within a horizontal distance of 30" and **R** $\leq$ 7.0", then add 0.075" additional width per occupant
Then **W = 0.375** = 0.3 + 0.075 (Formula 10-3)

Case 4 – Where egress requires stair descent without a handrail within a horizontal distance of 30" and **R** > 7.0", then add the 0.075" additional width per occupant plus a factor
Then **W = 0.375 + 10(R – 7.0")(0.005)** (Formula 10-4)

Case 5 – Where ramped means of egress > 1:12 slope Then **W = 0.22** (Formula 10-5)

Case 6 – Where level or ramped means of egress $\leq$ 1:12 slope, Then **W = 0.20** (Formula 10-6)

Note that for outdoor smoke-protected assembly seating, the width may meet the lesser of clear width of Section 1008.5.3 or the Table 1008.5.2 requirement serving the same number of seats.

Case 7 – Where outdoor smoke-protected seating using stairs Then **W = 0.08** (Formula 10-7)

Case 8 – Where outdoor smoke-protected seating using ramps, corridors, tunnels or vomitories
Then **W = 0.06** (Formula 10-8)

NOTE THAT MINIMUM AISLE WIDTHS PER SECTIONS 1008.7.1, 1008.7.2, 1008.7.3, AND 1008.7.4 MUST ALSO ALWAYS BE PROVIDED. These widths include:

42" aisle for level or ramp with seats both sides
36" aisle for level or ramp with seats on both sides if under 50 seats
36" aisle for level or ramp with seats one side
23" clear to handrail serving aisle stair less than 5 rows on one side
48" for aisle stairs with seats on both sides
36" aisle stair w/seats both sides if < 50 seats
36" for aisle stairs with seats one side
23" clear to handrail dividing an aisle stair

WORKSHEET INSTRUCTIONS

ROOM OR SPACE DESIGNATION	OCCUPANCY OR USE CLASSIFICATION	OCCUPANT LOAD FROM WORKSHEET	STAIR WIDTH FACTOR	REQUIRED STAIRWAY WIDTH	OTHER EGRESS COMPONENT FACTOR	OTHER EGRESS COMPONENT WIDTH

In the ROOM OR SPACE DESIGNATION (first) column above, the name or number of a room or space is noted. When adjacent rooms on a floor level have the same use, they may be designated together as one entry. This may be the same as listed in the Occupant Load Worksheet or a part of the space listed in that worksheet, when separate spaces or rooms are within a designated area.

OCCUPANCY OR USE CLASSIFICATION (second) column would have an entry of what the space will be used for, the function of the space. This may be matched with the use in the first column of IBC Table 1003.2.2.2, which is labeled as OCCUPANCY. Where function of the space does not match the table, then use the most similar to that actually is shown in the table.

OCCUPANT LOAD FROM WORKSHEET (third) column above is simply the room or space total as taken from the eighth column of the Occupant Load Worksheet. If that Worksheet has not yet been completed, you will have to at least complete the calculations that would be required by that sheet to obtain a number for this column.

STAIR WIDTH FACTOR (fourth) column is the value taken from IBC Table 1003.2.3 for the occupancy (and complete sprinkler system or not provided) being exited. Assembly seating facilities are the only exception to this, as IBC Table 1008.5.2 aisle stairs have a different factor.

REQUIRED STAIRWAY WIDTH (fifth) column is *at least* the product of the occupant load (third column) times the width factor (fourth column). Minimum width requirements shall be met for each stair. Requirement of IBC Section 1003.3.3.1 is usually 44” minimum (exceptions may apply). Per IBC Section 1003.2.13.2 for accessible means of egress serving an area of refuge provide a minimum of 48” between handrails or by IBC Section 1008.7.1 for Assembly aisle stair usually 48” for seating both sides or 36” on one side is needed (with some exceptions).

OTHER EGRESS COMPONENT FACTOR (sixth) column is the factor, used for paths such as corridors, ramps, and doorways, taken from IBC Table 1003.2.3 for the occupancy being exited (and complete sprinkler system or not provided). Assembly seating facilities are the only exception to this, as IBC Table 1008.5.2 passageways and ramps have a different factor.

OTHER EGRESS COMPONENT WIDTH (seventh) column is *at least* the product of the other egress component factor (seventh column) times the occupant load (third column). Minimum width requirements shall be met for each doorway, ramp or corridors as required by other parts of IBC Chapter 10.

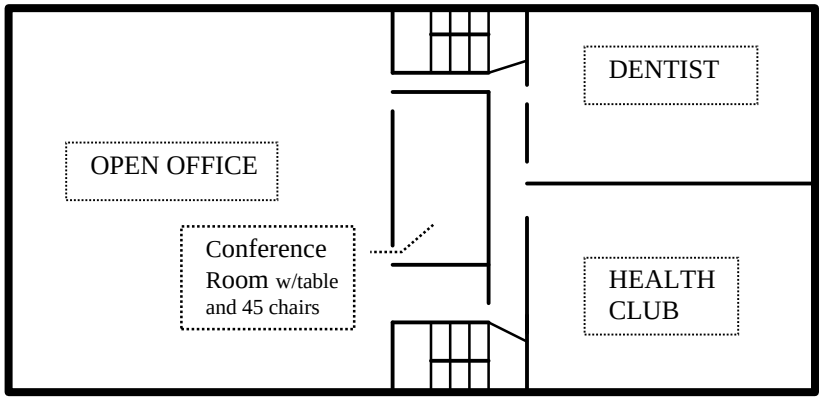
Please see the examples showing the use of this worksheet on the following pages.

WORKSHEET EXAMPLE

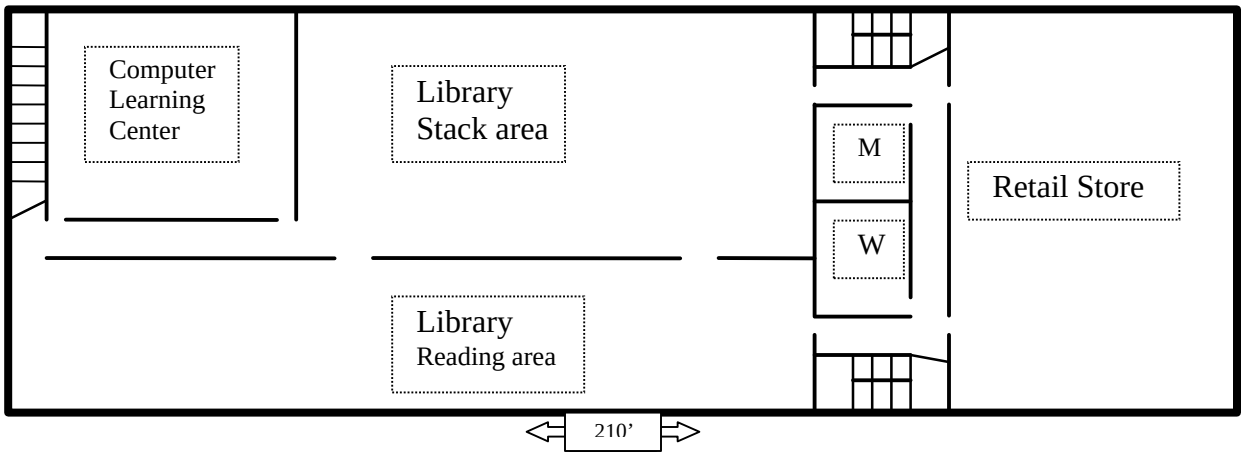
EXAMPLE 1

A multiple occupancy building of type IIIA construction without sprinklers shown below is three stories in height. The floor plans for each story are shown below.

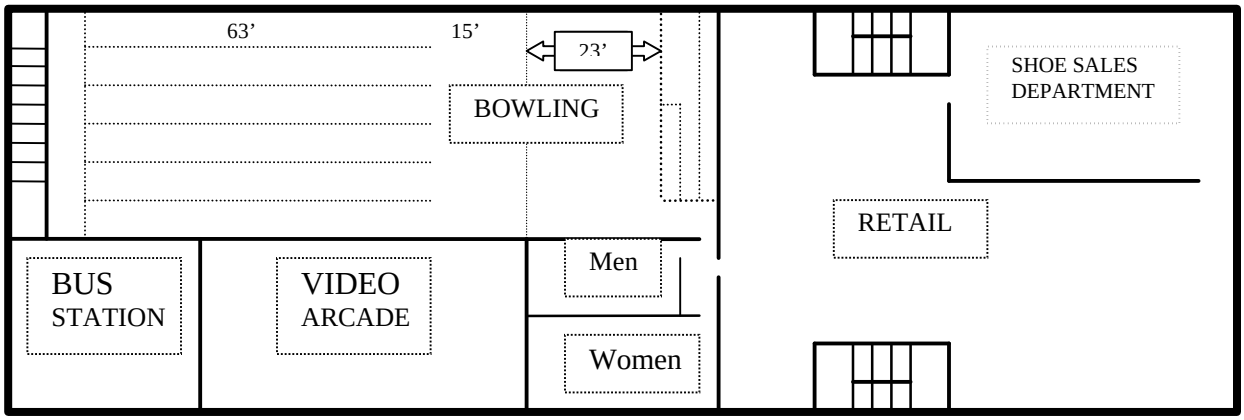
Third floor of 140'x 70' contains an Open Office with a 14'x 35' Conference Room, stairways & corridor, a 40'x 50' Health Club, and a 30'x 50' Dental Clinic. Owner statement is on file for limiting conference room use.



Second floor as shown below contains a 40'x 43' Computer Learning Center, a Library with 45'x 90' stack area & 25'x 140' reading area, a 50'x 70' Retail store, corridor and 2 toilet rooms.



First floor shown below includes Bowling alley with 6 lanes with 23'x 40' additional public area, a 33'x 30' Bus Station, a 56'x 30' Video Arcade, two toilet rooms, and a 90'x 70' Retail store. Bowling alley also rents as a wedding reception hall, by putting a temporary floor over the lanes.



EXAMPLE 1 (continued)

First step would be to complete the Occupant Load Worksheets or at least the applicable parts.

Third floor sheet would look like this:

OCCUPANT LOAD WORKSHEET

ROOM OR SPACE DESIGNATION	CLASSIFICATION OF OCCUPANCY OR USE	ROOM OR SPACE TOTAL	OCCUPANTS ACCOUNTED FOR IN OTHER SPACES
Third floor Open Office	Business	104	
third floor Conference	Assembly unconcentrated	45	YES
third floor Dentist Clinic	Institutional outpatient area	15	
third floor Health Club	Exercise rooms	40	

Note that the third floor conference room occupants are *only counted once* in total for that story. The total of 104 persons is for when outside people (45 clients) are meeting in the conference room and the office still has about 59 employees at their desks. Also note Dentist could have used Business at same density.

The total occupant load for this worksheet page (or story of the building) = 159 Occupants

Second floor sheet would look like this:

OCCUPANT LOAD WORKSHEET

ROOM OR SPACE DESIGNATION	CLASSIFICATION OF OCCUPANCY OR USE	ROOM OR SPACE TOTAL
second floor Learning Center	Educational Classroom	86
second floor Library stacks	Library Stack area	35
second floor Library reading	Library Reading rooms	81
second floor Retail	Mercantile other floors	81

Total occupant load of this story 283 Occupants.

First floor worksheet would look like this:

OCCUPANT LOAD WORKSHEET

ROOM OR SPACE DESIGNATION	CLASSIFICATION OF OCCUPANCY OR USE	ROOM OR SPACE TOTAL
first floor Retail	Mercantile grade floor	240
first floor Bowling Alley	Bowling center Assembly uncon.	264
first floor Bus Station	Airport terminal waiting area	66
first floor Video Arcade	Assembly Gaming floors	153
first floor north stairway	None	0

Total occupant load of this story 723 Occupants.

The total occupant load for this building = 1165 Occupants *(total of all worksheets/stories)*

From those numbers, you can fill in the first three columns of the Egress Width Worksheet as shown on the following page. Then you can complete the remainder of the worksheet.

EXAMPLE 1 (continued)

Size of door minimum clear width, 44" or 36" at corridors.

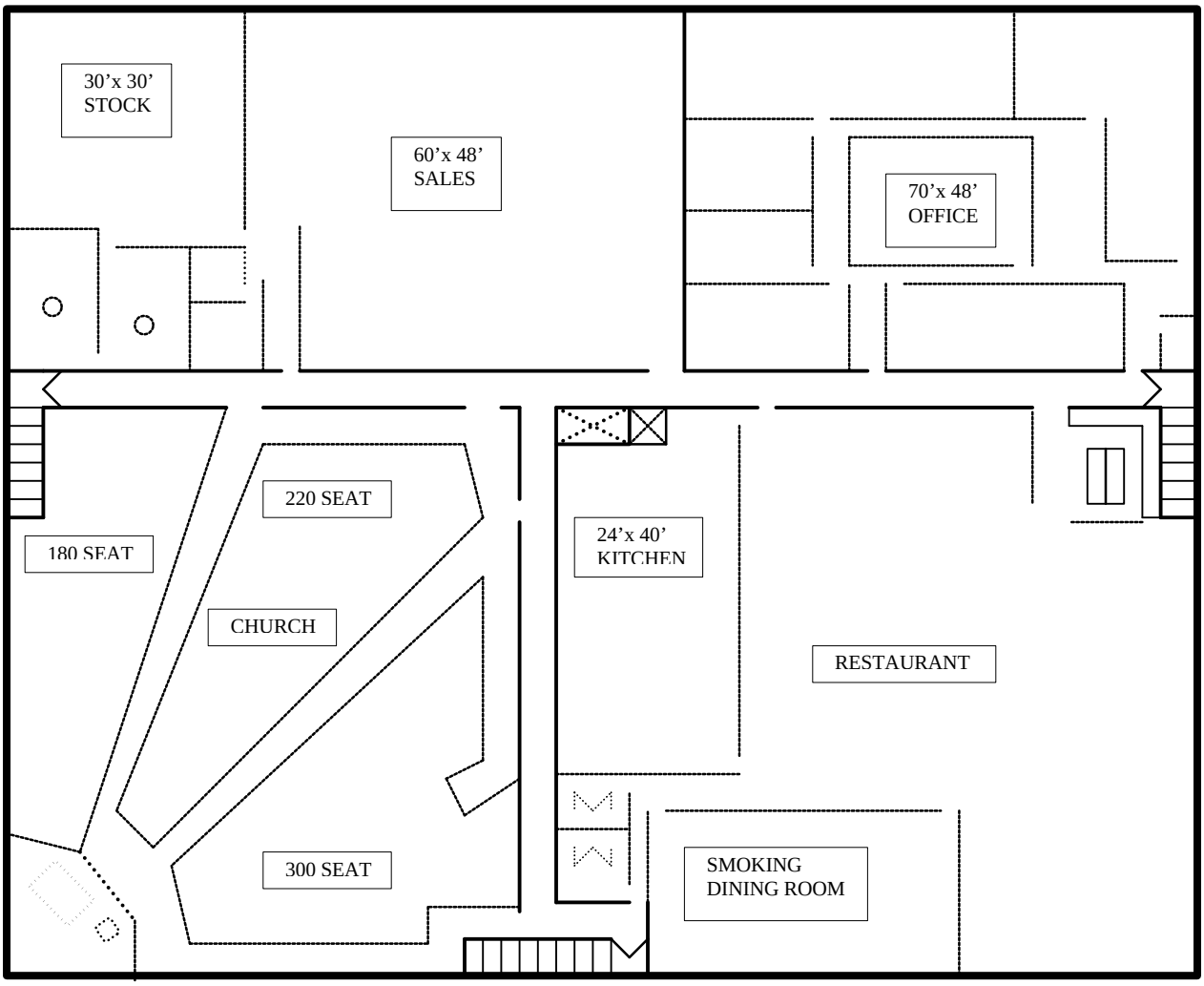
EGRESS WIDTH WORKSHEET

ROOM OR SPACE DESIGNATION	OCCUPANCY OR USE CLASSIFICATION	OCCUPANT LOAD FROM WORKSHEET	STAIR WIDTH FACTOR	REQUIRED STAIRWAY WIDTH	OTHER EGRESS COMPONENT FACTOR	OTHER EGRESS COMPONENT WIDTH
Third floor Open Office	Business	104			0.2	*21" 32" minimum
third floor Conference	Assembly unconcentrated	45			0.2	*9" 32" minimum
third floor Dentist Clinic	Institutional outpatient area	15			0.2	*3" 32" minimum
third floor Health Club	Exercise rooms	40			0.2	*8" 32" minimum
Third Floor Total	**Total**	**159**	**0.3**	**48"**	**0.2**	**32"**
second floor Learning Center	Educational Classroom	86	0.3	*36" 48" minimum	0.2	*18" 32" minimum
second floor Library stacks	Library Stack area	35			0.2	*7" 32" minimum
second floor Library reading	Library Reading rooms	81	0.3	*25" 48" minimum	0.2	*17" 32" minimum
second floor Retail	Mercantile other floors	81			0.2	*17" 32" minimum
Second Floor Total	**Total**	**283**	**0.3**	**85"**	**0.2**	**57"**
first floor shoe department	Mercantile grade floor	50			0.2	*10" 32" minimum
first floor Retail	Mercantile grade floor	240			0.2	48"
first floor Bowling Alley	Bowling center Assembly uncon.	264			0.2	53"
first floor Bus Station	Airport terminal waiting area	66			0.2	*14" 32" minimum
first floor Video Arcade	Assembly Gaming floors	153			0.2	*31" 32" minimum
first floor north stairway	**None**	**101**	**0.3**	***31" 48" minimum**	**0.2**	***21" 32" minimum**
first floor east stairway	**None**	**92**	**0.3**	***28" 48" minimum**	**0.2**	***19" 32" minimum**
first floor west stairway	**None**	**92**	**0.3**	***28" 48" minimum**	**0.2**	***19" 32" minimum**

* Stairway widths must meet Sections 1003.3.3.1 & 1005.3.3.1 minimum widths and corridor & door minimum width shall meet Sections 1004.3.2.2 & 1003.3.1.1 minimum values respectively. Note that the above stairway minimum 48" is clear width between handrails per IBC 1003.2.13.2

EXAMPLE 2

Below is the second floor plan of a building with complete sprinkler system. Show the required minimum widths for the exit stairs and other egress components. N ◄——► S



The northeast tenant is a retail store with offices, toilets, and stock room. The gross square foot area of stock room is 900 square feet, which would yield 3 occupants at 300 square foot gross per occupant. The gross area of the store with offices, toilet rooms and main corridor serving this tenant is 90'x 54' minus 900 SF divided by 60 square foot per occupant would yield 66 occupants. Thus a total 69 occupants.

The southeast has an office tenant, which including the main corridor would be 70'x 54' at 100 square feet per occupant, yields an office with 38 occupants.

The southwest is restaurant with 245 seat main dining, 56 seat smoking dining room, and waiting area seating for 16, a kitchen, and two toilet rooms. The kitchen would have 5 occupants per Table 1003.2.2.2

The northwest portion is a church containing 700 seats and a small altar platform in the northwest corner, which would have 3 occupants. Since the church is an assembly seating facility, the Assembly Egress Sub-Worksheet is needed to calculate factors for aisle and doorway minimum widths.

EXAMPLE 2 (continued)

EGRESS WIDTH WORKSHEET

Size of door minimum clear width, 44" or 36" at corridors.

ROOM OR SPACE DESIGNATION	OCCUPANCY OR USE CLASSIFICATION	OCCUPANT LOAD FROM WORKSHEET	STAIR WIDTH FACTOR	REQUIRED STAIRWAY WIDTH	OTHER EGRESS COMPONENT FACTOR	OTHER EGRESS COMPONENT WIDTH
STOCK	Mercantile Stock	3			0.15	*1" 32" minimum
SALES	Mercantile other floors	66			0.15	*10" 32" minimum
OFFICE	Business areas	38			0.15	*6" 32" minimum
KITCHEN	Kitchens, commercial	5			0.15	*1" 32" minimum
Smoking Dining room	Assembly table & chair	56			0.15	*9" 32" minimum
Waiting	Assembly concentrated	16			0.15	*3" 32" minimum
RESTAURANT main dining	Assembly table & chair	245			0.15	37"
RESTAURANT whole tenant	Assembly table & chair	322	0.2	65"	0.15	49"
CHURCH whole tenant	Assembly w/ fixed seats	703			** 0.20	141"
CHURCH north aisle	Assembly w/ fixed seats	290	** 0.375	109"	** 0.20	58"
CHURCH center aisle	Assembly w/ fixed seats	263	** 0.375	99"	** 0.20	53"
CHURCH west aisle	Assembly w/ fixed seats	150	** 0.3	45"	** 0.20	*30" 36" aisle minimum
North stair and corridor		400	** 0.375	150"	** 0.20 (most restrictive)	80"
South stair and corridor		400	** 0.375	150"	** 0.20 (most restrictive)	80"
West stair and corridor		332	** 0.375	121"	** 0.20 (most restrictive)	67"

As assembly seating width is more restrictive in common corridors, that must be used.

**See the next page for the assembly sub-worksheet.

Again note that the minimum clear widths for doors are noted in the last column, but corridors usually require either 44" or 36" minimum per IBC Section 1004.3.2.2 (with some exceptions).

EXAMPLE 2 (continued)

ASSEMBLY EGRESS WIDTH SUB-WORKSHEET

Is the occupant load of a Group A occupancy over 300 persons? _**YES** (Yes or No) If yes, see Section 1008.1

This will require the church tenant to have a main exit with at least 50% of required exit width provided at the main exit or permits the exits to be distributed to total 100% if there is no clear main exit from the assembly space. This Example 2 has no clear main exit for the church.

Is the assembly seating area smoke-protected? _**NO**__ (Yes or No) *As the answer is **no**, then use the following requirements from Section 1008.5.1 as listed below.* Clear width of aisles and other means of egress for non-smoke-protected seating shall be per cases 1 through 6 below.

Where **W** = Required width in **inches per occupant**
R = Riser height in inches (from tread to tread)

Case 1 – Where **R** $\leq$ 7.0" Then **W = 0.3** (Formula 10-1)

Case 3 – Where egress requires stair descent without a handrail within a horizontal distance of 30" and **R** $\leq$ 7.0", then add 0.075" additional width per occupant
Then **W = 0.375** = 0.3 + 0.075 (Formula 10-3)

Case 6 – Where level or ramped up to $\leq$ 1:12 slope Then **W = 0.20** (Formula 10-6)

These three above cases would apply to the egress from the church tenant. As the required stair width is over 60" wide, then a handrail will not be within 30" of everywhere in the decent of the stairs, thus case 3 will take precedence over case 1; thus the table will use W = 0.375 factor. The church west aisle (fourth to last entry of table) would have used case 1, as the resulting stair width was less than 30" each side to a handrail. However, when actual west stair is investigated, due to added occupants from restaurant and other church exits, the width exceeds 60" limit, thus the case 3 factor of 0.375" per occupant would have to apply (shown as last entry in the table).

Also note that the 0.375" per occupant factor for assembly would take precedence over the normal 0.2" per occupant for stairs serving completely sprinkler protected building, because IBC 1008.5.1 is more restrictive than Table 1003.2.3 requirement. Section 1003.2.3 specifically mentions that minimum width must be at least the Table 1003.2.3 size ". . . and not less than specified elsewhere in this code."

*You should note that this example shows over 1000 people on the second floor, but there are only 3 exits (rated stairway enclosures) provided. Thus design shown **does not meet Section 1005.2.1** minimum requirement of at least 4 exits for over 1000 occupants, thus this building would require either a re-design of the uses or else a fourth exit to be added to exit this second floor. As door leaf size is limited to 48", the addition of a fourth stairway would be well advised for a probable solution.*